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Human Computer Interaction Based HEMD Using Hand Gesture

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Abstract--- *Hand gesture based Human-Computer-Interaction (HCI) is one of the most normal and spontaneous ways to communicate between people and apparatus to present a hand gesture recognition system with Webcam, Operates robustly in unrestrained environment and is insensible to hand variations and distortions. This classification consists of two major modules, that is, hand detection and gesture recognition. Diverse from conventional vision-based hand gesture recognition methods that use color-markers for hand detection, this system uses both the depth and color information from Webcam to detect the hand shape, which ensures the sturdiness in disorderly environments. Assurance its heftiness to input variations or the distortions caused by the low resolution of webcam, to apply a novel shape distance metric called Handle Earth Mover's Distance (HEMD) for hand gesture recognition. Consequently, in this paper concept operates accurately and efficiently. The intend of this paper is to expand robust and resourceful hand segmentation algorithm where three algorithms for hand segmentation using different color spaces with required thresholds have were utilized. Hand tracking and segmentation algorithm is found to be most resourceful to handle the challenge of apparition based organization such as skin dye detection. Noise may hold, for a moment, in the segmented image due to lively background. Tracking algorithm was developed and applied on the segmented hand contour for elimination of unnecessary background noise*

Keywords--- Gestalt User Interface, Human Apparatus Interaction, HCI, HEMD, Man Apparatus Interaction, VUI.

I. INTRODUCTION

Human computer interaction (HCI) involves the learning, preparation, intend and use of the interaction between client and server. It is often regarded as the crossroads of computer science design, media studies and other field of study. It is often regard as the crossroads of computer science, Humans interrelate with computers in several ways, and the border between humans and the computers they use is decisive to facilitate this interaction. Desktop application, internet browsers, handheld computers, and computer kiosks make use of the established graphical user interfaces (GUI) of today. Voice user interfaces (VUI) are used for speech recognition and synthesizing systems, and the emerging multi modal and gestalt User Interfaces (GUI) let humans to connect with personified character agents in a method that cannot be achieved with new interface paradigms. The Association for Computing Apparatus defines human computer interaction as "a obedience concerned with the intend, estimate and realization of interactive computing systems for human use and with the learn of major phenomenon nearby them". An important facet of HCI is the securing of user satisfaction. "Because human computer communication studies a human and a contraption in communication, it draws from behind information on both the contraption and the human side. On the apparatus side, techniques in computer graphics, operating systems, programming languages, and growth environments are relevant. Engineering and design methods are relevant." Due to the multidisciplinary nature of HCI, people with dissimilar backgrounds donate to its success. HCI is also from time to time referred to as human–apparatus interaction (HAI), man–apparatus interaction (MAI) or computer–human interaction. HCI aims to get better the connections flanked by users and computers by creation computers more working and accessible to users' needs. Particularly, HCI has wellbeing in methodologies and processes for designing interfaces process for implementing boundary techniques for evaluating and comparing interfaces developing new interfaces and communication techniques developing evocative and predictive models and theories of communication

II. GESTURE RECOGNITION

Gesture recognition is a computer science and language technology with the goal of interprets person gestures via

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numerical algorithms. Gestures can initiate from any physical activity or state but normally instigate from the face or hand. Present focuses in the field include sensation gratitude from the face and hand gesture gratitude. A lot of approach has been made using cameras and computer apparition algorithms to understand sign language. However, the identification and recognition of posture, gait, phonemics, and person behaviors is also the subject of signal gratitude technique. Signal gratitude can be seen as a method for computers to start on to appreciate person corpse language, thus structure a wealthier viaduct sandwiched between utensils and human than antique text user interface or even GUIs which immobile limit the greater part of input to keyboard and mouse. Signal gratitude enables humans to converse by means of the appliance HAI and interrelate obviously without any automatic strategy. Two types of gestures are notable: [9] we believe online gestures, which can also be regard as straight manipulations like scaling and rotating. Offline gestures: person's gestures that are processed succeeding to the user communiqué with the entity. Online gestures: straight management gestures. The capability to pathway a person's behavior and bring to a close what gestures they may be performing arts can be achieved through a variety of tools. Though there is a great amount of explore done in image/video based gesture appreciation, there is some difference within the tools and environment used between implementations. Wired gloves these can offer input to the computer regarding the location and turning round of the hands using compelling or inertial tracking devices. In adding, some scarf can detect finger meandering by means of a high degree of accurateness. Depth-aware cameras- Using dedicated cameras such as structured light or time-of-flight cameras, one can create a deepness map of what is being seen throughout the camera at a short series, and use this data to approximate a 3d depiction of what is being seen. These can be efficient for uncovering of hand gestures owing to their tiny choice capabilities. Stereo cameras using two cameras whose kindred to one another are known, a 3D depiction can be approximated by the output of the cameras. Organizer based gestures these controllers act as an addition of the corpse so that when gestures are performed, some of their activity can be expediently capture by software. Strategy such as the LG Electronics Magic baton, the Loop and the scrape use Hillcrest Labs' Free space technology, which uses MEMS accelerometers, gyroscopes and other sensors to interpret gestures into cursor association. Solitary camera a normal 2D camera can be used for gesture acknowledgment where the resources/environment would not be expedient for other forms of image-based gratitude. Former it was consideration that solitary camera may not be as effectual as stereo or depth conscious cameras, but a number of companies are demanding this theory. In order to understand actions of the corpse, one has to categorize them according to ordinary properties and the communication the movements may express. For example, in sign language each gesture represents a word or phrase.

III. HAND GESTURE RECOGNITION ALGORITHM

3D model based algorithms

The 3D model approach can use volumetric or skeletal models, or even a combination of the two. Volumetric approaches have been heavily used in computer animation industry and for computer vision purposes. The models are generally created of complicated 3D surfaces, like NURBS or polygon meshes. The drawback of this method is that is very computational intensive and systems for live analysis is still to be developed. For the moment, a more fascinating move toward would be to map uncomplicated prehistoric objects to the person's most significant body parts and analyze the way these interact with each other.

Fig. 1: 3D based model

- Skeletal-based algorithm

Instead of using concentrated dispensation of the 3D models and trade with a lot of parameters, one can just use a simplified version of joint angle parameters along with segment lengths. This is known as a skeletal depiction of the body, where a virtual skeleton of the person is computed and parts of the body are mapped to certain segments.

3.3. Appearance-based models

These models don't use a spatial depiction of the body anymore, because they derive the parameters directly from the images or videos using a template database. Some are based on the deformable 2D templates of the human parts of the body, particularly hands. Deformable templates are sets of points on the outline of an object, used as interpolation nodes for the object's outline approximation.

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IV. APPLICATIONS BASED ON THE HANDS FREE INTERFACE

4.1. Interactive expositions

Nowadays, expositions based on new ways of interaction need contact with the visitors that play an important role in the exhibition contents. Museums and expositions are open to all kind of visitors, therefore, these ‘‘sensing expositions’’ look forward to reaching the maximum number of people. This is the case of ‘‘Galicia digital’’, an exposition. Visitors go through all the phases of the exposition sensing, touching and receiving multimodal feedback such as audio, video, hap tics, interactive images or virtual reality. In one phase there is a slider-puzzle with images of Galicia to be solved. There are four computers connected enabling four users to compete to complete the six puzzles included in the application. Visitors use a touch-screen to interact with the slider-puzzle, but the characteristics of this application make it possible to interact by means of the hands-free interface in a very easy manner. Consequently, the application has been adapted to it and therefore, disabled people can also play this game and participate in a more active way in the exposition.

4.2. Non verbal communication. By means of human computer interaction, one ambitious objective is to achieve communication for people with speech disorders using new technologies. Some speech therapists use it in their sessions to help themselves with children with speech disorders and to help in the prevention of linguistic and cognitive delays in crucial stages of a child’s life. The application can work with any language, as long as there is an available compatible SAPI (Speech Application Programming Interface). The potential users of Bliss Speaker are children with speech disorders; therefore, its operation is to be very simple and intuitive.

V. HAND MODELING FOR GESTURE RECOGNITION

Human hand is an uttered object with 27 bones and 5 fingers. All of these fingers consist of three joints. The four fingers are aligned together and connected to the wrist bones in one tie and at a distance there is the thumb. Thumb always stands on the other side of the four fingers for any operation, like capturing, grasping, holding etc. Human hand joints can be classified as flexion, twist, directive or spherical depending up on the type of movement or possible rotation axes. In total human hand has approximately 27 degrees of freedom. As a result, a large number of gestures can be generated. Therefore, for proper acknowledgment of the hand, it should be modeled in a manner comprehensible as a border in HCI. There are two types of gestures, Temporal and Spatial. Non-geometric features cannot be seen individually and collective processing is required. The deformable templates are flexible in nature and allow changes in shape of the object up to certain limit for little variation in the hand shape. Image motion based model can be obtained with deference to color cues to weigh the hand.

Fig.2: Various Hand Modeling Techniques

VI. COLOR MODELS

The aim of the proposed concept is to overcome the confront of skin color detection for normal interface between user and apparatus. So to notice the skin color beneath active background the study of a variety of dye models was done for pixel based skin detection. Three color spaces have been chosen which are usually used in computer hallucination applications. RGB The main advantage of this color space is simplicity. It does not separate luminance and chrominance, and the RGB mechanism is highly correlated. HSV It expresses Hue with dominant color of an area. Saturation measures the colorfulness of an area in proportion to its brightness. This model gives poor result where the brightness is very low. Other similar color seats are HSI and HSL.

VII. CONCLUSION

The design of more natural and multimodal forms of interaction with computers or systems is an aim to achieve. Hallucination based interfaces can offer attractive solutions to introduce non invasive systems with interface by means of gestures. In organize to build dependable and healthy perceptual user interfaces based on computer vision, certain practical constraints must be taken in account the request must be able of working well in any atmosphere and should create use of low cost devices. This work has proposed off to several computer vision techniques for facial and hand features detection and tracking and countenance gesture

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recognition, a number of them have been better and enhanced to arrive at more constancy and robustness. A hands-free interface able to replace the standard mouse motions and proceedings has been residential using these techniques. Hand gesture recognition is finding its application for non verbal communiqué flanked by human and computer, general fit person and physically challenged people, 3D betting, practical certainty etc. With the add to in applications, the gesture recognition system demands lots of research in different directions.

REFERENCES

[1] A.Alberto Cavallo,"Online Segmentation and Classification of Manipulation Actions from the Observation of Kinetostatic Data, "Human Apparatus Syst., vol.44, no, 2014

[2] M. R. Ahsan, "EMG Signal Classification for Human Computer Interaction: A Review," Eur. J. Sci. Res., vol. 33, no. 3, pp. 480–501, 2009.

[3] J. A. Jacko, "Human–computer interaction design and development approaches," in Proc. 14th HCI Int. Conf., 2011, pp. 169–180.

[4] H. Moon, M. Lee, J. C. Ryu, and M. Mun, "Intelligent Robotic Wheelchair with EMG-, Gesture-, and Voice-Based Interface," Intell.Robots Syst., vol. 4, pp. 3453–3458, 2003.

[5] M. Walters, S. Marcos, D. S. Syrdal, and K. Dautenhahn, "An Interactive Game with a Robot: People's Perceptions of Robot Faces and a Gesture Based User Interface," in Proc. 6th Int. Conf. Adv. Computer–Human Interactions, 2013, pp. 123–128.

[6] O. Brdiczka, M. Langet, J. Maisonnasse, and J. L. Crowley, "Detection human behavior models from multimodal observation in a smart home," IEEE Trans. Autom. Sci. Eng., vol. 6, no. 4, pp. 588–597, Oct. 2009.

[7] M. A. Cook and J. M. Polgar, Cook & Hussey's Assistive Technologies: Principles and Practice, 3rd ed. Maryland Heights, MO, USA: MosbyElsevier, 2008, pp. 3–33.

[8] G. R. S. Murthy, and R. S. Jadon, "A review of vision based hand gesture recognition," Int. J. Inform. Technol. Knowl. Manage. vol. 2, no. 2, pp. 405–410, 2009.

[9] D. Debuse, C. Gibb, and C. Chandler, "Effects of hippotherapy on people with cerebral palsy from the users' perspective: A qualitative study," Physiotherapy Theory Practice, vol. 25, no. 3, pp. 174–192, 2009.

[10] J. A. Sterba, B. T. Rogers, A. P. France, and D. A. Vokes, "Horseback riding in children with cerebral palsy: Effect on gross motor function," Develop. Med. Child Neurology, vol. 44, no. 5, pp. 301–308, 2002.